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March 31, 2017

VIA ELECTRONIC FILING

Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street S.W.
Washington D.C. 20554

Re: Oral *Ex Parte* Notice
GN Docket No. 14-177, IB Docket Nos. 15-256 and 97-95;
RM-11664 and 11773; and WT Docket No. 10-112

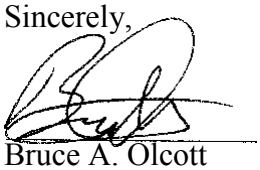
Dear Ms. Dortch:

On March 29, 2017, representatives of The Boeing Company ("Boeing") met with Commissioner Michael O'Rielly to discuss the above captioned proceedings. Participating in the meeting on behalf of Boeing were Bruce Chesley, Audrey Allison, Robert Vaughan, Matthew Dzugan, and the undersigned.

During the meeting, the Boeing representatives provided an overview of Boeing's proposal to operate a non-geostationary satellite orbit ("NGSO") system operating using spectrum in the V-band. The Boeing representatives also discussed the Commission's Spectrum Frontiers proceeding and the potential for spectrum sharing between the Upper Microwave Flexible Use Service ("UMFUS") and next-generation broadband satellite communications systems in the V-band. Both of these discussions tracked closely with the attached presentation materials.

Thank you for your attention to this matter. Please contact me if you have any questions.

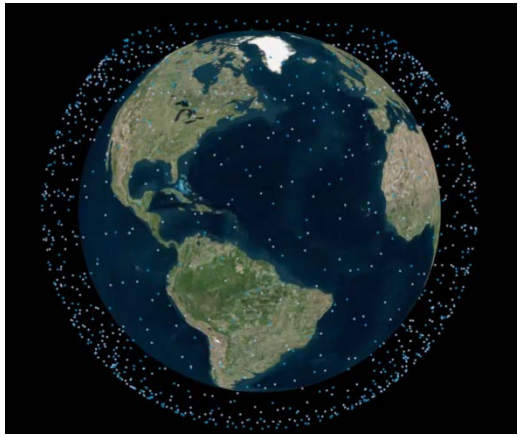
Sincerely,



Bruce A. Olcott
Counsel to The Boeing Company

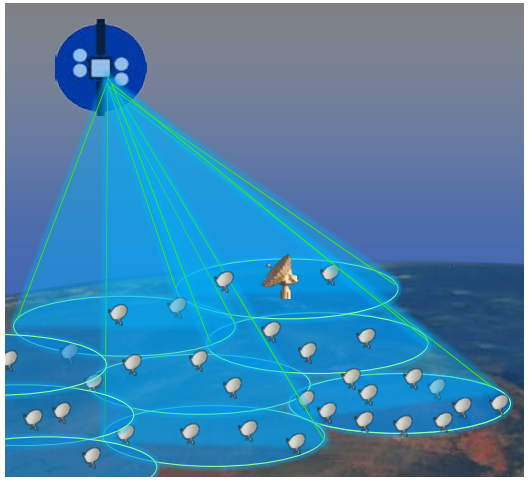
Attachment

Boeing V-Band Global Broadband System



Global Constellation
Spacecraft Qty: 1396/2956
Orbit Altitudes: 970 - 1,082 km
Orbit Inclinations: 45°, 55° & 88°

Provides Global Coverage



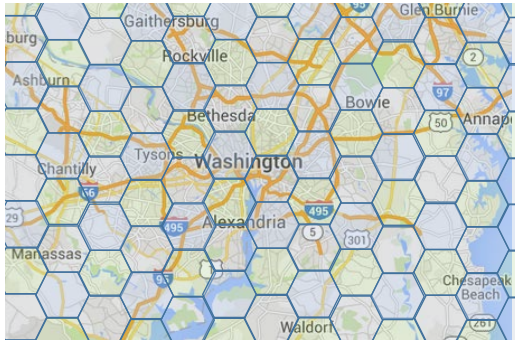
System Design

Broad Coverage LEO Satellites with Flexible Beam-forming Technology

Phased array antennas form robust links with high throughput and isolation and low side-lobe beams

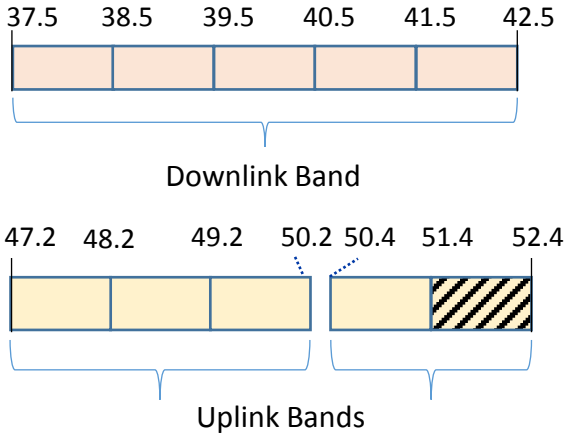
Millimeter wave technology proven and deployed in government and commercial FSS and terrestrial systems

8 km cells over Washington DC



Service Density
3-Color (Time) reuse allows for very high throughput that is competitive to serve both urban and rural areas

Peak User Rates
Exceeds FCC's Broadband Goals
>25 Mbps Down / >3 Mbps Up



Frequency Plan

Each Beam uses all 5 GHz, dual polarization, up and down

Time domain division between adjacent cells

Gateways and user terminals share uplink and downlink bands

Broadband speeds are available to all global users

Spectrum Frontiers – Topics for FNPRM

Topic	Rationale

Opportunistic Access to the 37.5-40.0 GHz Band	• Satellite end user terminals can receive signals in this spectrum on a secondary, opportunistic basis
	  • UMFUS systems will be unaware of the presence of such satellite end user terminals
	• Need to define conditions under which satellites are permitted to increase power in response to rain fade
	  • FCC has already authorized such power increases (25.208(r)(2)), but has not finalized the details
	  • Resulting power on the ground will not change and no harmful interference will result to UMFUS

Primary Access to the 47.2-50.2 GHz Band	• FCC has long identified this band for satellite end user uplink transmissions on a paired basis with the 40.0-42.0 GHz satellite downlink band • While band could be shared with UMFUS, satellite end user terminals would need to be primary

Coordinated Access to the 50.4-52.4 GHz Band for Individually-Licensed Gateways	• Satellite gateway facilities can be restricted to the most rural areas where UMFUS is unlikely to deploy
	  • Strategic site selection and shielding can be used to minimize affected areas
	  • Requires action on Boeing's petition for the creation of an FSS allocation in the 51.4-52.4 GHz band

Spectrum Frontiers – Topics for Reconsideration

Topic	Rationale

Base Station Maximum EIRP	• 75 dBm/100 MHz power adopted based on claims of wide area networks and indoor penetration
	  • mmW spectrum optimal for small cells and is not practical for wide area networks
	  • Higher power will not facilitate indoor penetration, it will only increase multipath interference
	• Should reduce UMFUS base station maximum EIRP to 65 dBm/100 MHz to promote sharing

Beamforming of UMFUS Transmissions	• Importance of beamforming acknowledged by many UMFUS proponents
	• Expected use of beamforming was heavily relied on throughout the Order
	  • Off-axis rules already exist for other services, including LMDS and 39 GHz fixed service
	• Should adopted a simple off-axis gain mask based on planned UMFUS small planar array devices
	  • Would not impede the development or flexibility of UMFUS technology

Power Control for UMFUS Transmissions	• Power control widely used in mobile services to maximize network capacity and conserve batteries
	• Power control needed for intra-service sharing and to maximize device battery life
	• Relied on by Spectrum Frontiers Order in analyses of sharing with FSS and FS
	  • Advantages range from 3 to 7 dB, 50% to 90% of the time
	  • Base station power control range will be even broader
	• Adopt simple rule language requiring power control mechanisms (similar to other wireless services)

Spectrum Frontiers – Topics for Reconsideration

Topic	Rationale
Part 101 FS and UMFUS Merged Regulations	• No one sought authority to operate omni-directional "broadcast" networks using UMFUS spectrum • UMFUS should not be permitted to use omni-directional antennas either for fixed or mobile services • Part 30 co-mingles rules for fixed "hubs" at up to 85 dBm and mobile "base stations" at 75 dBm • Fixed service rules should remain in Part 101, which is entitled "Fixed Microwave Services"
FSS in 42.0-42.5 GHz Band	• 42.0-42.5 GHz band is very appropriate for FSS since it is adjacent to the 40.0-42.0 GHz band • FSS can operate on a shared basis in this spectrum just as proposed for the 37.5-40.0 GHz band

Earth Station Siting Rules (PEAs/percent population)	• 0.1% limit makes it extremely difficult to locate earth stations in rural PEAs. Tiered approach better:
	  • Retain a strict percentage limit in populous PEAs (*i.e.*, 0.1 or 0.2%)
	  • Allow a higher, but still very low, percentage in very rural PEAs (*i.e.*, 5%)
	• Compliance with percentage limits makes numerical limits irrelevant
	  • Numeric limit of 3 earth stations per PEA (1,248 total in the US) is too restrictive to fulfill Boeing's earth station needs and could not accommodate multiple V-band satellite systems